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THE
FORTY-THIRD ANNUAL REPORT
OF THE
BOARD OF DIRECTORS
OF THE
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MUS. COMP. ZOOLOGY
CAMBRIDGE MASS.
ZOOLOGICAL SOCIETY
OF PHILADELPHIA.

(INCORPORATED MARCH 21ST, 1859.)

READ AT THE ANNUAL MEETING OF THE MEMBERS AND LOAN-
HOLDERS OF THE SOCIETY.

APRIL 22d, 1915.

PHILADELPHIA:
PRESS OF ALLEN, LANE & SCOTT,
1211-1213 Clover Street.
1915.

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THE
ZOOLOGICAL SOCIETY OF PHILADELPHIA.
(FAIRMOUNT PARK.)

BOARD OF DIRECTORS:

ELECTED BY THE SOCIETY.

CHARLES B. PENROSE, M. D., <i>President.</i>	WILLIAM D. WINSOR, NORTON DOWNS, M. D., W. B. CADWALADER, M. D., <i>Secretary.</i>
CHARLES M. LEA, SAMUEL G. DIXON, M. D., <i>Vice-President.</i>	ROBERT G. LE CONTE, M. D., HENRY PRATT McKEAN, CLEMENT B. NEWBOLD, CHARLES S. W. PACKARD, <i>Treasurer.</i>
CHRISTIAN C. FEBIGER, <i>Vice-President.</i>	
THOMAS DEWITT CUYLER, OWEN WISTER, CHARLES PLATT, JR., D. M. BARRINGER,	GEORGE L. HARRISON, JR., ALFRED GRATZ, RICHARD H. HARTE, M. D.

ELECTED BY THE CITY COUNCILS.

SHELDON POTTER,	JOHN P. CONNELLY.
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SUPERINTENDENT OF THE GARDEN.

ROBERT D. CARSON.

PATHOLOGIST.

HERBERT FOX, M. D.

ASSISTANT PATHOLOGIST.

FREDERICK D. WEIDMAN, M. D.

SOLICITOR.

W. W. MONTGOMERY.

REPORT

OF THE

BOARD OF DIRECTORS.

PHILADELPHIA, April 22d, 1915.

The Board of Directors of the Zoological Society of Philadelphia presents to the members and loanholders its forty-third annual report, for the year ending February 28th, 1915.

GENERAL AFFAIRS AND FINANCES.

The number of members at the close of the year was:—

Annual members.....	199
Life members.....	1,007
Honorary members.....	12
Perpetual memberships.....	247
Junior members.....	45
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Total members.. ..	1,510

The following is a report in detail of the admissions and receipts for the year:—

Adults (paying at gates).....	148,191
Children (paying at gates).....	45,162
Members (including life and annual members, loanholders' annual, and complimentary annual tickets)	1,466
Loanholders' single tickets.....	3,937
Free admissions (charitable institutions, donors' tickets, &c.)*.....	6,978
Coupon tickets.....	36
Excursion tickets.....	1,619
<hr/>	
	207,389

* In addition to these, 250,000 tickets were issued to the Board of Education, for the admission of pupils of the Public Schools.

*Monthly Record of Receipts from Admissions for 1914-1915
with corresponding account for 1913-1914.*

MONTH	1913-1914	1914-1915	COMPARISON
March.....	\$1,809 05	\$1,130 25	Decrease... \$678 80
April.....	1,672 25	2,750 40	Increase1,078 15
May.....	3,913 00	4,879 15	Increase... 966 15
June.....	3,768 25	3,209 40	Decrease... 558 85
July.....	4,263 20	4,301 05	Increase... 37 85
August.....	5,913 95	5,213 25	Decrease... 700 70
September..	3,605 40	3,853 25	Increase.... 247 85
October....	2,639 50	2,595 90	Decrease.... 43 60
November..	1,795 85	1,857 45	Increase.... 61 60
December..	1,207 90	484 55	Decrease... 723 35
January....	770 30	768 60	" 1 70
February...	830 55	1,408 90	Increase.... 578 35
	\$32,189 20	\$32,452 15	Increase.... 262 95

It is gratifying to be able to report an increase in gate receipts over those of last year. In view of the financial uncertainty following the outbreak of the war in Europe and the phenomenal increase in the number of motion picture establishments, this is most encouraging, and it shows that the continually increasing value and extent of the collections have been appreciated by the public.

The filling in and grading of the Thirty-fourth Street extension to the Garden has been continued, more than 75,000 cubic yards of material from the old Spring Garden reservoir having been utilized for this purpose; however, much additional work will have to be done before the ground is ready for use.

The water supply to the Garden has been increased by a new connection with the city main on Thirty-fourth Street. 1250 feet of six-inch pipe were laid and connected with the water system of the Garden, and fire hydrants have been installed, so that now the Garden

has a good supply of water, and, for the first time, an adequate water protection against fire.

In order to preserve the collection of trees in the Garden and to make it of greater interest to visitors, every year a number of young trees have been planted, most of which have been labeled carefully, so that now more than 400 specimens can be identified by signs bearing their common and botanical names and the locality from which they originally came.

An unusual amount of work has been done not only in repairs, but also in permanent improvements, including the completion of the fence on the new line of the Garden along Zoological Street, renewing about 1700 square yards of asphalt walk, building concrete bathing pool for the hippopotamuses and tanks for both species of tapirs, and erecting additional outdoor cages for monkeys and other animals.

Of particular interest were the animals presented November 22d by the Museum of the University of Pennsylvania, Dr. G. B. Gordon, Director, collected by the "South American Expedition of the University Museum," in charge of Dr. William Curtis Farabee. Five of these species have not been represented in our collection before.

The thanks of the Board are extended to all from whom favors have been received.

By order of the Board of Directors.

WILLIAMS B. CADWALLADER,
Secretary.

MEMORIAL
TO
DR. THOMAS BIDDLE.

Elected a Director of the Society, December 8th, 1898.
Appointed to Executive Committee, February 9th, 1899.
Chairman Executive Committee, from May 2d, 1906.

Dr. Thomas Biddle, a Director of the Zoological Society, died of pneumonia on the night of Friday, February 19th, of this year. Dr. Biddle was elected a director of the Society in 1898. For many years he had been Chairman of the Executive Committee. His interest in the Zoological Garden was unflagging. His time and energy were devoted to its welfare. He continually presented many interesting and valuable animals to the collection. The present prosperity of the Garden is largely the result of his labors. His sterling virile qualities, his generosity, his unselfish efforts, and his kindliness, endeared him to the keepers and to all others working at the Garden.

The Directors of the Zoological Society have suffered an irreparable loss in the death of their friend and colleague.

TREASURER'S REPORT.

INCOME AND EXPENDITURES.

For the fiscal year ending February 28th, 1915.

INCOME.

Admission receipts.....	\$32,452 15
Rents at Garden.....	250 00
Interest.....	1,641 38
Sale of guides.....	236 83
Donkey rides.....	1,232 45
Sundry receipts.....	1,852 11
Received from the City of Philadelphia through the Commissioners of Fairmount Park.....	50,000 00
<hr/>	
Total income.....	<u>\$87,664 92</u>

EXPENDITURES.

Salaries.....	\$24,364 45
Office expenses.....	1,477 53
General expenses.....	46,058 98
Purchase of animals.....	9,166 44
Permanent improvements.....	2,555 95
Permanent improvements contracted for	7,500 00
<hr/>	
Total expenditures.....	\$91,123 35
Excess of expenditures over income.....	3,458 43
<hr/>	
	<u>\$87,664 92</u>

C. S. W. PACKARD,
Treasurer.

Audited and found correct, April 3d, 1915.

STOCKTON BATES & SONS.

SUPERINTENDENT'S REPORT.

To the Board of Directors of the Zoological Society of Philadelphia:

GENTLEMEN:—I beg to submit my report for the year ending February 28th, 1915.

Total number of animals exhibited in each class during the year:—

MAMMALS.....	562
BIRDS.....	1,052
REPTILES.....	616
AMPHIBIANS.....	49
	<hr/>
	2,279

The species and sub-species exhibited in the collection for the first time were:—

Noisy Douroucoul (*Aotes vociferans Spix*).

Habitat, Upper Amazon.

A female of this species, one of the rarest of the night monkeys, was presented on November 22d by the Museum of the University of Pennsylvania.

Red-ruffed Lemur (*Lemur varius ruber* E. Geoffroy).

Hab., Madagascar.

A male and female in perfect condition were acquired by purchase on March 15th. This is the handsomest and most brilliantly colored of all the lemurs and is now considered a sub-species of the black-and-white lemur, although formerly looked upon as one of its numerous variations. This pair, with several others of the same kind, composed, almost certainly, the first invoice of these animals to arrive in this country.

Jungle Cat (*Felis chaus* Gldenstdt).

Hab., India and North Africa.

A male and two females of this distinctively graceful form of the Felid were purchased on May 14th.

These animals breed freely with the domestic cat

and the majority of the few that are captured show a taint of that cross; these three, however, are of undoubted purity.

Tibetan Blue Bear (*Ursus pruinosus* Blyth).

Hab., Tibet, in the neighborhood of Llasa.

In what was probably the last shipment of large wild animals from Europe for some time to come, and which arrived in New York about February 1st, there were several young bears, which had been sent over as Russian brown bears (*ursus arctos*); two of these, a male and female, were received by purchase on February 9th; they are strikingly different from any of the described varieties of that not very variable species, but correspond in every external particular with the descriptions of the Tibetan Blue Bear of Blyth. It has been impossible, so far, to ascertain where these animals were captured, but their detailed resemblance to the descriptions of this species, which is, perhaps, most strikingly shown in the hoary appearance of their fur, from their white tipped blackish hair, a character not known to exist in any other of the Old World bears, and to the plate in the Proceedings of the Zoological Society of London, under date of April 6th, 1897, would appear to justify their specific identification as *pruinosus*, and to consider them, zoologically at least, as the most important acquisition of the year.

South African Hedgehog (*Erinaceus frontalis* A. Smith).

Hab., South Africa.

A pair by purchase on June 20th. A very small form compared with the common one of Europe. This interesting insectivore belongs to an order representatives of which are too infrequently seen in living collections.

Sooty Agouti (*Dasyprocta nigra* Gray).

Hab., Brazil.

Another rare mammal collected by the South American Expedition of the University Museum and pre-

sented to the Society on November 22d. This rodent, a female, was probably the first living specimen of its kind to be exhibited in this country.

Pied Crow-Shrike (*Strepera graculina* White).

Hab., Australia.

A single specimen was purchased on June 20th. This is a higher passerine form, of much interest in itself, and additionally so from the fact that it is the first of its genus we have ever had. These birds appear to be common in Australia, but this individual seems to be the first brought here alive.

Black-backed Piping Crow (*Gymnorhina tibicen* Latham).

Hab., Australia.

Two purchased on November 10th. While we always have had the only other member of this genus, the white-backed species, these are the first of the black-backed in the collection. The contrasting black and white plumage, fine carriage and clear liquid notes of these birds, in addition to their agreeing together and thriving in captivity, make them one of the most satisfactory aviary exhibits.

Burchell's Glossy Starling (*Chalcopssar australis* Smith).

Hab., South Africa.

A single specimen of one of the rarer species of this singularly handsome group was purchased on June 20th.

Indian Gray Shrike (*Lanius lahtora* Sykes).

Hab., India.

Two were acquired by purchase on May 14th.

Sundara Flycatcher (*Niltava sundara* Hodgson).

Hab., Himalaya Mountains into West China.

One purchased on June 20th. The flycatchers, of the family *Muscopidæ*, are rarely represented in living collections, and this is the first of the group we have ever had.

Mountain Chat (*Saxicola monticola* Vieillot).

Hab., South Africa.

One was purchased on March 17th.

Gray-winged Ousel (*Merula bouboul* Latham).

Indian Laughing Thrush (*Trochalopteryx lineatus* Vigors).

Tawny-throated Thrush (*T. rufigularis* Gould).

Single specimens of each of these three Himalayan thrushes were received by purchase, the ousel on December 19th, and the others on November 10th.

Madrass Red-vented Bulbul (*Pycnonotus hæmorrhous* Gmelin).

Hab., Southern and Central India and Ceylon.

One was purchased on October 30th.

Blue-winged Green Bulbul (*Chloropsis hardwickii* Jardine and Selby).

Hab., India.

One was purchased on June 20th. This species, from the highlands of India, is a beautifully marked representative of the bulbuls or fruit thrushes which are found in great variety in Asia, and particularly in India; they are characterized by their sprightliness, bright colors and, in many species, attractive song, and are, in consequence, general favorites both in their wild state and as cage birds.

Yellow-billed Hornbill (*Lophoceros flavirostris* Ruppell).

Hab., East Africa.

A pair of these small hornbills was acquired by purchase on June 20th.

White-crested Touracou (*Turacus corythaix* Wagler).

A fine species of a genus which possesses, in common with many of the family *Musophagidæ* or plantain-eaters, the extraordinary peculiarity that the brilliant crimson of the primary feathers contains a rare metallic pigment known as turacin, from which copper has been extracted.

Gray Touracou (*Schizorhis concolor* Smith).

Another touracou, plain gray in color, in striking contrast to the brightly hued one noted above. Both of these birds are native to South Africa, and a single specimen of each was obtained by purchase on June 20th.

Yellow-thighed Caica (*Caica xanthomera* G. R. Gray).

Lesser Rufous-vented Guan (*Penelope boliviana* Bonaparte).

Piping Guan (*Pipile cumanensis* Jacquin).

One specimen of each of these three species was collected on the Amazon by the South American Expedition of the University Museum, and received as a donation from that institution on November 22d. The fact that they had never been exhibited by the Society indicates that they are far from common. The piping guan deserves special mention as a rare and handsome form of the characteristically South American *Gallinæ*.

Burmeister's Cariama (*Chunga burmeisteri* Reichenbach).
Hab., Argentine Republic.

Two were purchased on October 30th. There are two genera of these birds, and each contains but one species; *burmeisteri* appears to be decidedly the least common of the two; their affinities with both the cranes and hawks long made them a puzzle to the systematists, who, finally, compromised by giving them a family name of their own, the *Cariamidæ*.

New Zealand Spotted Gecko (*Hoplodactylus maculatus* Gray).

Hab., New Zealand.

Four by purchase on October 16th.

Surinam Ameiva (*Ameiva ameiva* Linnæus).

Hab., South America to Nicaragua.

Five lizards received by purchase on September 24th.

One of a number of species in its genus which, on account of its beauty and inoffensiveness is, in some

localities at least, like the common green lizard of Europe, a general favorite notwithstanding the popular prejudice against reptiles.

Washington Garter Snake (*Thamnophis elegans biscutata* Cope).

Hab., Oregon and Washington.

Four of this well-marked sub-species of the common garter snake were obtained by purchase on June 4th.

In addition to the foregoing, the value of the collection was further increased by the purchase of an unusual number of animals of the first importance, as follows:—

Two Orang-utans. A young male and female of these man-like apes were received on June 22d; this species, as a rule, is sluggish and dull in captivity, but “Villa” and “Silvia” soon became contented and active and, probably, on this account have thriven beyond expectation. When received at the Garden, their combined weight was $25\frac{1}{2}$ pounds, on February 28th it was 55 pounds, a gain of over 100 per cent. in nine months.

One Northern Sea Lion. A young male was received on June 14th, and, with the possible exception of a single individual, never positively identified, exhibited shortly after the Garden was established, is the first of the true sea lions the Society has been able to obtain. The males of this species are said to attain a length of 13 feet and to weigh 1300 pounds or more. This specimen, which was believed to be but little more than a year old, weighed 172 pounds when it came, almost as much as a fair-sized adult California hair seal, commonly, although wrongly, called the “Sea Lion,” would weigh.

A male Brazilian Tapir was obtained on April 18th from the National Zoological Park, Washington, D. C., where it had been bred.

A female Prjevalsky's Horse arrived on April 23d from the herd in the New York Zoological Park; with the male received the preceding year from the Cin-

cinnati Garden, we now have as distantly related a pair of these remarkable animals as it is possible to obtain.

A male Burchell's Zebra and a female Mountain Zebra were received on February 10th, each as a mate for others of the same species but of opposite sex then in the collection.

A pair each of Dromedaries and Bactrian Camels were received, the former on April 4th and the latter on November 12th.

Four Black-footed Penguins arrived on June 20th.

Six monkeys were born during the year, two in the Monkey House and four in the outdoor cage, this is an unusual number for one season, and as, with the exception of one which died shortly after birth, they are all thriving, a most satisfactory condition of health and vigor is indicated in the collection of primates. Young monkeys, born in captivity, seldom reach maturity, but as these are all about the same size, they will be placed together in an outdoor cage during the warm weather in the hope that companionship and fresh air will lead to a more favorable result.

A ring-tailed lemur was born in March, its rapid growth—it is now almost as large as its parents—is in strong contrast to the slow physical development of the monkeys, but one step above the lemurs in zoological position.

Another notable birth was that of three grizzly bears; the mother of these cubs has, for two years in succession and on the same day, January 8th, given birth to young, those of last year lived only a day or two, but on the date of this report, this year's young are alive and thriving. The Society now possesses eight grizzly bears, more than it ever before owned at one time.

A California hair seal, which was born on May 26th, has successfully passed through its puppy stage, and is now almost entirely on a fish diet and is growing rapidly.

The Coypus, a large furbearing water rodent from the warmer parts of South America, were kept out of doors all winter, and not only did well, but the female gave birth to five young in November, four of these soon disappeared, no doubt dying from the cold, but the fifth has survived and is rapidly approaching its parents in size.

The following is a full list of the births during the year:—

- 1 pig-tailed macaque (*Macacus nemestrinus*), ♀, December 2d.
- 5 rhesus macques (*M. rhesus*), ♀ and 4 ♂s, March 23d, April 20th, May 13th and 24th, and June 8th.
- 1 ring-tailed lemur (*Lemur catta*), ♀, March 27th.
- 4 Maholi galagoes (*Galago maholi*), April 20th, two females gave birth to two each on the same day.
- 1 puma (*Felis concolor*), August 25th.
- 2 gray wolves (*Canis mexicanus*), ♂s, March 27th.
- 5 American badgers (*Taxidea taxus*), March 24th, 26th and April 5th.
- 8 raccoons (*Procyon lotor*), March, April, June and August.
- 3 grizzly bears (*Ursus horridus*), January 8th.
- 1 California hair seal (*Zalophus californianus*), ♂, May 26th.
- 5 coypus (*Myocaster coypus*), November.
- 1 Canada porcupine (*Erethizon dorsatus dorsatus*), ♀, June 19th.
- 1 yak (*Pæphagus grunniens*), ♂, April 30th.
- 2 Himalayan thar (*Hemitragus jemlaicus*), ♀s, May 30th and June 21st.
- 1 red deer (*Cervus elaphus*), ♂, August 6th.
- 1 American elk (*C. canadensis*), ♀, October 7th.
- 1 fallow deer (*C. dama*), ♀, June 11th.
- 3 Japanese sika deer (*C. sika*), ♂, ♀, and ♂, May 30th, June 15th and 26th.
- 1 Manchurian sika deer (*C. s. manchuricus*), ♀, September 3d.

- 1 Barasingha deer (*C. duvauceli*), ♀, May 2d.
- 1 Eld's deer (*C. eldi*), ♂, November 24th.
- 4 white-tail deer (*Mazama virginiana*), 2 ♂s and 2 ♀s,
May 27th, June 9th and July 10th.
- 1 huanaco (*Lama huanacos*), ♂, July 8th.
- 2 llamas (*L. glama*), ♂s, December 23d and 24th.
- 1 dromedary (*Camelus dromedarius*), ♂, May 15th.
- 5 northern wart hogs (*Macrocephalus africanus*), July
12th.
- 4 rufous rat kangaroos (*Epyprymnus rufescens*), Apri
27th, September 7th, January 21st and February
14th.
- 2 herring gulls (*Larus argentatus smithsonianus*), June 8th.
- 3 hybrid gulls, herring and black-backed, June 8th.
- 2 common night herons (*Nycticorax nycticorax nævius*),
June 19th.
- 2 black swans (*Cygnus atratus*), July 9th.
- 2 Canada Geese (*Branta canadensis*), May 11th.
- 1 fulvous tree duck (*Dendrocygna fulva*), June 19th.
- 19 banded water snakes (*Tropidonotus sipedon fasciatus*),
August 28th.
- 16 Fairie's garter snakes (*Thamnophis proxima*), August
1st.
- 3 copperhead snakes (*Ancistrodon controtrix*), October
29th.
- 7 ground rattlesnakes (*Sistrurus miliarius*), August 30th.
- 4 banded rattlesnakes (*Crotalus horridus*), November
21st.

The percentage of loss through death was but a fraction of one per cent. greater than that of last year and would have been much less had it not been for the death of a large Indian elephant, received in 1876, while quite young. "Empress," in all probability, would have lived some years longer had she not slipped and fallen on the soft ground between her bathing tank and the Elephant House, the injury resulting from her fall being the immediate cause of her death. An interesting fact in connection with her is that she was not known to have lain down voluntarily during the last five years of her life.

Other important losses through death were a female sun bear, in the collection for eighteen years; a male Livingstone's eland and two cervine kangaroos and, among the birds, a male South African ostrich, a rhea and three emus, a condor and an Australian brush turkey.

An exceptionally large Japanese salamander was the only important loss in the Reptile House.

Respectfully,

ROBERT D. CARSON,
Superintendent.

ZOOLOGICAL GARDEN, March 1st, 1915.

LIST OF ADDITIONS TO THE MENAGERIE DURING THE YEAR ENDING
FEBRUARY 28TH, 1914.

- 1914.
- Mar. 10. 2 pumas (♂ ♀) and 1 snowy owl purchased.
 12. 5 American crows purchased.
 15. 2 black and white lemurs (♂ ♀) and 2 red ruffed lemurs (♂ ♀) purchased.
 17. 1 rhesus macaque (♀), 1 white-fronted lemur (♂), 3 mongoose lemurs (♀s),
 1 shama thrush, 2 bearded titmice, 1 short-tailed pitta and 1 mountain
 chat purchased.
 21. 1 rat kangaroo born in the Garden.
 1 great horned owl presented by Angelo M. Carlucci, Philadelphia, Pa.
 23. 1 rhesus macaque (♀) born in the Garden.
 24. 1 striped hyena (♂) purchased.
 2 American badgers born in the Garden.
 26. 2 American badgers born in the Garden.
 27. 1 horned rattlesnake purchased.
 1 ring-tailed lemur (♀) and 2 gray wolves (♂ ♂) born in the Garden.
 31. 2 anubis baboons (♂ ♀), 2 Guinea baboons (♂ ♀), 1 hamadryas baboon (♀),
 1 serval (♀), 2 beech martens (♂ ♂), 2 European badgers (♂ ♀),
 2 European wolves (♂ ♀), 1 common jackal (♂), 2 Victoria crowned
 pigeons, 1 marabou stork, 2 brush turkeys and 1 giant salamander
 purchased.
- April 4. 2 dromedaries (♂ ♀) purchased.
 5. 2 American badgers born in the Garden.
 6. 1 raccoon born in the Garden.
 9. 2 Chinese mynahs, 1 black-headed mynah, 2 pied mynahs and 1 wandering
 tree pie purchased.
 14. 2 muhlenberg's terrapin, 1 painted terrapin and 1 spotted terrapin purchased.
 15. 1 screech owl presented by John Regan, Philadelphia.
 16. 6 Canada porcupines purchased.
 18. 1 Brazilian tapir (♂) purchased.
 2 alligators presented by H. B. Beitler, Philadelphia.
 20. 1 rhesus macaque (♂) and 4 Maholi galagoes born in the Garden.
 22. 5 canary birds presented by Mrs. E. Stone, Philadelphia.
 2 alligators presented by Mrs. E. Toland, Wynnewood, Pa.
 23. 1 Prjevalsky horse (♀) purchased.
 2 Java peafowl (♂ and ♀) and 2 black-headed sibilas purchased.
 25. 2 Gila monsters purchased.
 1 blue-fronted amazon presented by James A. Stafford, Philadelphia.
 27. 3 raccoons (♂ ♂ ♀) born in the Garden.
 28. 1 bald eagle and 1 red-tailed buzzard presented by Lieut. E. S. Willing, Phila-
 delphia.
- May 30. 1 yak (♂) born in the Garden.
 2. 1 Barasingha deer (♀) born in the Garden.
 3. 1 yellow-fronted amazon presented by Charles A. Kauffmann, Philadelphia.
 4. 1 striped water snake presented by Samuel Scoville, Jr., Philadelphia.
 6. 1 woodchuck presented by Dr. Norton Downs, Three Tuns, Pa.
 7. 2 alligators presented by Charles A. Beers, Philadelphia.
 11. 2 Canada geese born in the Garden.
 11. 2 ground rattlesnakes, 3 harlequin snakes, 3 black snakes, 3 chicken snakes,
 1 corn snake, 3 common garter snakes, 2 Sacken's garter snakes, 6
 hog-nosed snakes, 3 king snakes, 2 banded water snakes, 1 brown water
 snake, 3 whip snakes and 4 fence lizards purchased.
 12. 1 pine snake presented by Guy King, Philadelphia.
 13. 1 rhesus macaque (♂) born in the Garden.
 14. 3 jungle cats (♂ and ♀ ♀) and 2 Indian gray shrikes purchased.
 15. 1 dromedary (♂) born in the Garden.
 17. 1 yellow-bellied songster presented by P. F. Harpel, Philadelphia.
 18. 1 African silverbill presented by Mrs. Effingham Perot, Philadelphia.
 19. 1 black snake presented by Samuel Scoville, Jr., Philadelphia.
 21. 3 long-nosed vipers, 4 tessellated snakes, 1 spotted snake, 3 vivacious snakes,
 4 European common snakes, 3 Dahl's snakes, 1 Æsculapian snake, 3
 dark green snakes, 2 glass snakes and 3 European green lizards.
 24. 1 rhesus macaque (♂) born in the Garden.
 1 alligator presented by George Rebitz, Philadelphia.
 26. 1 California hair seal (♂) born in the Garden.
 1 alligator presented by Master George F. Pawling, Philadelphia.
 27. 1 Virginia deer (♂) born in the Garden.
 28. 1 alligator presented by Master Walter M. Woodbury, Cynwyd, Pa.
 30. 1 tahr (♀) and 1 Japanese sika deer (♂) born in the Garden.
 1 European wild cat (♂) purchased.
 31. 1 crowned horned lizard presented by H. W. Aitken, Philadelphia.
 1 alligator presented by Miss Anna Zimmerman, Philadelphia.
 2 alligators presented by M. B. Kugler, Philadelphia.

- June 1. 1 alligator, presented by Master Lehman Robb, Philadelphia.
 2. 1 fishing cat (♂) purchased.
 3. 8 common European partridges and 2 European flamingoes purchased.
 4. 4 red-sided garter snakes, 4 elegant garter snakes and 4 Washington garter snakes purchased.
 6. 1 ring-necked pheasant (♂) presented by Sidney Gest, Overbrook, Pa.
 1 alligator presented by Joseph Dunlap 3d, Philadelphia.
 8. 1 rhesus macaque (♂), 2 herring gulls and 3 hybrid gulls born in the Garden.
 9. 2 Virginia deer (♂ ♀) born in the Garden.
 1 painted terrapin, presented by William Doud, Philadelphia.
 10. 2 Coscoroba swans purchased.
 11. 1 fallow deer (♀) born in the Garden.
 1 painted terrapin, presented by Master Percy Dare, Hartsville, Pa.
 10 spotted newts, presented by Victor Grillet, Manoa, Pa.
 14. 1 Northern sea lion (♂) purchased.
 1 common waxwing, presented by P. F. Harpel, Philadelphia.
 1 mountain black snake, presented by Chester Webb, Wayne, Pa.
 15. Japanese sika deer (♀) born in the Garden.
 16. 1 red-eared terrapin presented by Dr. Ida A. Keller, Philadelphia.
 1 Lindheimer's snake, presented by The Pennsylvania Society for the Prevention of Cruelty to Animals.
 17. 1 banded rattlesnake, 2 black snakes and 1 striped water snake purchased.
 17 hellbenders, presented by Joseph Berrier, Harrisburg, Pa.
 19. 1 Canada porcupine, 1 fulvous tree duck and 2 night herons born in the Garden.
 3 prairie rattlesnakes, 4 yellow-bellied black snakes, 2 Fairie's garter snakes, 3 elegant bull snakes, 3 red-sided garter snakes, 3 hog-nosed snakes, 2 Say's king snakes, 3 milk snakes, 3 Western sand snakes, 1 Graham's water snake, 1 Holbrook's water snake, 3 whip snakes and 1 American glass snake purchased.
 20. 2 South African hedgehogs (♂ ♂), 1 Cape hyrax (♂), 1 pied crow-shrike, 1 Burchell's glossy starling, 1 rose-colored pastor, 3 beautiful grass finches, 3 Gouldian grass finches, 2 red-billed hornbills, 2 yellow-billed hornbills, 1 blue-winged green bulbul, 1 Sundara flycatcher, 1 white-crested touracou, 1 gray touracou, 1 Pondicherry vulture, 4 black-footed penguins, 2 spotted monitors, 2 Cunningham's skinks, 2 White cyclo-dus, 2 gigantic zonurus and 2 stump-tailed lizards purchased.
 21. 1 Himalayan tahr (♀) born in the Garden.
 22. 2 orang-utans (♂ and ♀) purchased.
 23. 2 Western diamond rattlesnakes purchased.
 24. 1 goldfinch, 1 yellow-bellied liothrix, 1 red-headed weaver and 2 Java sparrows, presented by Mrs. Leonard J. Bamberger, Philadelphia.
 27. 1 pond tortoise and 1 European land tortoise purchased.
 26. 3 spotted wild cats, presented by James W. Smith, Willcox, Arizona.
 1 Japanese sika deer (♂) born in the Garden.
 28. 1 garter snake, presented by Master Richard M. Worrlow, Media, Pa.
 30. 1 bald eagle purchased.
- July 1. 2 sparrow hawks, born in the Garden.
 2. 4 sparrow hawks, presented by William D. Winsor, Philadelphia.
 3. 1 striped water snake and 2 spotted terrapins purchased.
 7. 1 pine snake presented by J. C. Taylor, Philadelphia.
 8. 2 alligators, presented by Miss Ivins, Philadelphia.
 1 huanaco (♂) born in the Garden.
 9. 2 black swans born in the Garden.
 10. 1 common deer born in the Garden.
 11. 3 red salamanders presented by Charles E. Ritter, Philadelphia.
 12. 5 Northern wart hogs born in the Garden.
 14. 4 Western diamond rattlesnakes purchased.
 16. 1 red-tailed buzzard and 1 Cooper's hawk, presented by Ellison A. Smyth, Jr., Blackburg, Virginia.
 18. 1 geometric and 1 leopard tortoise purchased.
 21. 7 pine snakes purchased.
 1 common water snake presented by Charles E. Kreps, Manayunk, Philadelphia.
 22. 1 sharp-shinned hawk presented by James Rourk, Philadelphia.
 24. 1 pine snake presented by A. W. Conge, Philadelphia.
 27. 1 alligator presented by William R. Lininger, Philadelphia.
 1 giant toad presented by William Beisel, Philadelphia.
 28. 1 young night heron presented by John Nordlinder, Philadelphia.
 30. 1 spotted cavy and 1 American white pelican purchased.
 2 European green lizards, 4 European toads and 4 European land tortoises presented by Jacob Hope, Philadelphia.
- Aug. 1. 1 pine snake presented by R. J. Kauch, Philadelphia.
 16 Fairie's garter snakes born in the Garden.
 3. 1 peacock presented by Miss A. C. Knight, Philadelphia.
 1 young night heron presented by Harry Segall, Philadelphia.
 4. 1 alligator presented by Miss Virginia Hess, Germantown, Philadelphia.

- Aug. 5. 6 banded rattlesnakes, 6 copperhead snakes, 2 black snakes and 1 milk snake purchased.
 6. 1 red-bellied terrapin presented by George W. Dearden, Philadelphia.
 10. 1 green-cheeked amazon presented by Mrs. Weir, Philadelphia.
 13. 1 black-backed jackal (♂) purchased.
 14. 1 Say's pine snake presented by Robert D. Traister, Norristown, Pa.
 18. 1 Canada porcupine presented by L. D. Swain, Renova, Pa.
 2 pale-headed parakeets, 1 bronze-winged pigeon and 2 blood-breasted pigeons purchased.
 22. 2 raccoons born in the Garden.
 25. 1 puma born in the Garden.
 28. 1 coypu (♀) purchased.
 19 banded water snakes born in the Garden.
 29. 1 banded rattlesnake presented by Oaks Fire Company, Oaks, Pa.
 30. 7 ground rattlesnakes born in the Garden.
- Sept. 3. 1 Manchurian sika deer (♀) born in the Garden.
 5. 1 alligator presented by Mrs. J. J. Parmelee, Highland Park, Pa.
 6. 1 red deer (♂) born in the Garden.
 1 Texas mud turtle, 1 Louisiana mud turtle, 1 musk turtle, 1 margined painted terrapin, 1 spotted terrapin and 1 painted box tortoise purchased.
 7. 1 rat kangaroo born in the Garden.
 9. 1 Pennant's parakeet, 15 undulated grass parakeets, 2 black Indian cuckoos, 1 Indian mynah and 2 common troupials purchased.
 13. 1 common night heron presented by Edward J. Clegg, Philadelphia.
 14. 2 alligators presented by C. J. Wortman, Philadelphia.
 16. 1 squirrel monkey (♂) presented by R. Hemple, Sr., Atlantic City, N. J.
 18. 21 black snakes born in the Garden.
 22. 2 spotted wild cats (♂ ♀) presented by the National Zoological Park, Washington, D. C.
 23. 9 chestnut-eared finches, 4 spotted munia finches and 1 amadavine finch presented by Mrs. Jesse Nalle, Bryn Mawr, Pa.
 24. 1 purple-faced monkey, 4 Malaccan parakeets, 2 golden-headed conures, 2 palm tanagers and 5 Surinam aneiva lizards purchased.
 28. 1 alligator presented by Amos Williams, Philadelphia.
 1 common opossum presented by C. H. Broadwater, Maple Shade, N. J.
 29. 1 Indian python purchased.
 30. 2 common vipers, 7 long-nosed vipers and 3 eyed lizards purchased.
- Oct. 1. 1 blue-fronted amazon presented by Mrs. Eugene Guhlmann, Philadelphia.
 3. 1 gigantic zonurus and 1 White's cyclodus purchased.
 1 box tortoise presented by Howard De LaRue, Philadelphia.
 1 box tortoise presented by Master Luther Blessing, Philadelphia.
 7. 1 red-bellied snake presented by Dr. Charles B. Penrose, Philadelphia.
 1 American elk (♀) born in the Garden.
 9. 3 indigo buntings, 2 orange-winged parakeets, 3 ground rattlesnakes, 2 water moccasins, 2 harlequin snakes, 4 black snakes, 4 chicken snakes, 1 corn snake, 4 common garter snakes, 2 Sacken's garter snakes, 1 keeled green snake, 3 hog-nosed snakes, 2 indigo snakes, 2 king snakes, 1 pine snake, 1 red-bellied snake, 4 whip snakes, 1 banded water snake, 3 brown water snakes, 1 yellow-sided snake and 1 American glass snake purchased.
 1 common skunk (♂) presented by A. F. Sweeney, Philadelphia.
 11. 1 alligator presented by John E. Myers, Philadelphia.
 12. 2 American goldfinches presented by Mrs. L. M. Saunders, Philadelphia.
 13. 1 sulphur-crested cockatoo presented by Mrs. R. Sterne, Philadelphia.
 1 common night heron presented by the Great Northern Paper Co., Philadelphia.
 15. 1 diamond rattlesnake purchased.
 4 musk turtles presented by Charles Nagel, Philadelphia.
 16. 2 red foxes, 2 gray foxes and 4 New Zealand geckos purchased.
 17. 1 mountain balck snake, 4 yellow-bellied black snakes, 4 hog-nosed snakes, 1 Say's king snake, 1 Lindheimer's snake, 1 western sand snake and 4 whip snakes purchased.
 18. 1 box tortoise presented by Master Roy Young, Philadelphia.
 19. 1 box tortoise presented by Michael Welikes, Philadelphia.
 25. 1 rhesus macque (♂) presented by Dr. Geo. D. B. Darby, Merion, Pa.
 1 diamond-backed terrapin presented by Master Gerge Anderson, Jr., Philadelphia.
 28. 1 Java sparrow presented by F. Charles Reger, Philadelphia.
 29. 1 barn owl presented by J. E. Van Natta, Levistown, Pa.
 3 copperhead snakes born in the Garden.
 30. 1 red-vented bulbul, 2 Wagler's troupials and 2 Burmeister's cariamas purchased.
 1 alligator presented by William Hewlett, Audubon, N. J.
 1 great blue heron presented by Joseph Slomkowski, Philadelphia.
 31. 2 Canada lynx purchased.
- Nov. 2. 1 American coot presented by W..S. Furst, Philadelphia.
 5. 2 occipital blue pies and 2 white-throated jay thrushes purchased.

- Nov. 7. 2 common iguanas and 2 spiny comb iguanas purchased.
 2 alligators presented by Mrs. A. B. Davis, Philadelphia.
 8. 1 keeled green snake presented by C. M. Rauch, Harrisburg, Pa.
 9. 1 turkey vulture presented by Joseph Sutter, Philadelphia.
 1 Say's pine snake, 1 DeKay's snake and 1 painted terrapin presented by Prof. Frank G. Speck, Philadelphia.
 10. 2 Black-backed piping crows, 3 Gouldian grass finches, 1 cutthroat finch, 2 hooded finches, 1 spotted munia finch, 2 red-beaked weavers, 1 black-bellied weaver, 2 chestnut-eared finches, 2 saffron finches, 2 chukar partridges, 1 Indian laughing thrush and 1 tawny-throated thrush purchased.
 11. 1 mealy amazon presented by Mrs. Helen Robins, Philadelphia.
 1 garter snake, 1 spotted terrapin and 1 snapping terrapin presented by William Beisel, Philadelphia.
 12. 2 Bactrian camels (♂ ♀) purchased.
 1 Emory's snake exchanged.
 13. 1 opossum presented by G. W. Cassel, Philadelphia.
 19. 1 indigo snake presented by J. G. Patton, Philadelphia.
 21. 4 banded rattlesnakes born in the Garden.
 22. 1 noisy douroucoul, 1 jaguar, 1 ocelot, 1 ring-tailed coati, 1 sooty agouti, 1 yellow-thighed parrot, 1 razor-billed curassow, 1 lesser rufous-vented guan and 1 piping guan presented by the University Museum, Philadelphia.
 23. 1 American coot presented by Miss Mary Smyth, Philadelphia.
 24. 1 Eld's deer (♂) born in the Garden.
 28. 1 common macaque (♂) presented by V. P. Cibotti, Doylestown, Pa.
 29. 1 alligator presented by Stanley and Ethel DeBeer, Philadelphia.
- Dec. 1. 5 coypis born in the Garden.
 1 alligator presented by Mrs. Clifton Goodman, Philadelphia.
 2. 1 pig-tailed macaque (♀) born in the Garden.
 7. 1 rhesus macaque (♀) presented by M. Hamel, Mount Union, Pa.
 9. 1 opossum (♂) presented by Mrs. George Biddle, Philadelphia.
 2 western brook frogs, presented by William Beisel, Philadelphia.
 10. 1 tayra (♀) presented by Mrs. Frank Hall Perkins, Philadelphia.
 12. 5 brown pelicans purchased.
 14. 1 lesser sulphur-crested cockatoo presented by Mrs. Herbert Little, Philadelphia.
 16. 1 white-fronted amazon presented by Mrs. E. A. Thomas, Philadelphia.
 17. 1 screech owl presented by Master Irvine Hagan, Philadelphia.
 18. 1 Geoffroy's marmoset (♂) presented by Miss Mary Lockawitch, Philadelphia.
 19. 1 yellow-billed whistling thrush, 2 yellow-ammers, 2 green finches, 4 snow birds, 2 common siskins, 2 goldfinches, 2 chaffinches, 1 black-headed sibia and 1 gray-winged ouzel purchased.
 1 Cooper's hawk presented by Hugh R. Sullivan, Merion, Pa.
 23. 1 llama (♂) born in the Garden.
 24. 1 llama (♂) born in the Garden.
- 1915.
- Jan. 5. 12 Gambel's quail and 12 scaled quail purchased.
 8. 3 grizzly bears born in the Garden.
 11. 12 Texas quail purchased.
 13. 1 common opossum (♂) presented by Harry Rathbone, Philadelphia.
 21. 1 rufous rat kangaroo born in the Garden.
 12. 1 scaled quail purchased.
 22. 1 snapping terrapin, 1 common water snake and 1 common garter snake purchased.
 26. 2 skunks (♀ ♀) purchased.
 1 weeper cebus (♀) presented by Mrs. J. A. Byrne, Philadelphia.
 2 starlings presented by S. W. Downer, Downer, N. J.
- Feb. 1. 2 striated terrapins purchased.
 1 western brook frog presented by William Beisel, Philadelphia.
 2. 1 common deer (♂) purchased.
 1 screech owl presented by Master John O'Leary, Philadelphia.
 3. 1 lark sparrows purchased.
 9. 2 Tibetan blue bears (♂ ♀) purchased.
 10. 1 Burchell's zebra (♂) and 1 mountain zebra (♀) purchased.
 12. 1 American wild cat and 1 gray fox presented by Dr. Norton Downs, Three Tuns, Pa.
 14. 1 rufous rat kangaroo born in the Garden.
 18. 2 Northwestern pine martens (♂ ♀) purchased.
 19. 1 South African hedgehog (♀) exchanged.
 22. 1 common opossum (♂) presented by Miss Theresa Hayes, Philadelphia.

REPORT OF THE LABORATORY OF COMPARATIVE PATH-
OLOGY FOR THE YEAR ENDING FEBRUARY 28TH,
1915.

The mortality in the Garden for this fiscal year has been important both in the number of autopsies (352) and the character of animals dying in the collection. The number of deaths was considerably swollen by reason of an epidemic of infectious enteritis among newly imported quail. Aside from this, the number is greater than that reported in 1914, but about the same as in previous years. Among the important animals lost are the Indian elephant "Empress," a Leche ante-lope, a sun bear, a Livingstone's eland, an Indian coucal, a huanaco, a Tasmanian devil, and a giant salamander.

"Empress" had suffered from a mild rheumatic arthritis for several years; at autopsy it seemed that an acute inflammation of the upper bowel had hastened her end, for she showed chronic afflictions of several organs, such as tuberculosis of the lungs, nephritis and fibroid tumors of the ovaries. Could her condition have been diagnosed and treated it is doubtful if her life could have been greatly prolonged.

During the year Dr. Weidman has continued to study the parasties in addition to the general work of the laboratory that he has had time to do. He has reported a piece of work entitled "A Contribution to the Anatomy and Development of *Cladorchis Stichorchis Subtriquetrus*." He is now investigating the relation of lipoids to the local accumulations of adipose tissue so frequently seen in wild animals, and the importance of the *Coccidium bigeminum*.

Dr. Schumann has undertaken to arrange for the Laboratory a series of adult and fetal skulls and adult female pelves to show the evolution of these parts and their relation to the mechanism of labor. His second paper "The Dynamics of the Female Pelvis; Its Evolution and Architecture with Respect to Function" has been published in the *American Journal of Obstetrics and*

Diseases of Women and Children. The zoological material was obtained at this laboratory and at the Academy of Natural Sciences.

In December, 1914, I published a series of observations upon cirrheses of the liver in wild animals (*New York Medical Journal*, December 19, 1914). It was possible to collect seventeen cases of hepatic cirrheses among the 3200 autopsies then on record. Of these seventeen, ten were of the biliary form, now generally conceded to be due to infectious processes following the biliary tract, and in all probability originating in intestinal lesions. This is important when considered in connection with the knowledge of the frequency of enteritis, especially of the upper small intestines.

On the other hand, the portal or so-called atrophic cirrheses so usually associated with lues, gout and inorganic poisons in man, were found only four times. None of these cases of cirrhosis were diagnosed before death, and from the history it is doubtful if more than one or two cases would have been recognized had unlimited handling of the animals been possible.

Continued work upon the conjunctival test for tuberculosis in birds has given no reliable result. Some suspected parrots were tested, with negative results. A series of pigeons were injected with known avian tubercle bacilli and upon development of lesions were tested by dropping tuberculin made from avian and bovine bacilli into the conjunctival sac. Healthy controls were also tested. Now and then a slight redness would appear both in healthy and tuberculous birds, but no definite reaction resulted. Some observers have had positive results, while others have had nothing more definite than I have had. The reasons for this difference is not clear. The intracutaneous test in the comb, for birds having this appendage, seems more reliable.

At the end of the year I am investigating the quail epidemic and studying the lesions of the pancreas in wild animals. Scientific material has been supplied from the laboratory to Dr. McClung and to Dr. A. J. Smith.

In presenting the diagnoses upon the autopsy material I have used the same system as last year; the interesting material and special work is given in the second part of the report.

The following is a list of animals dying during the foregoing year. The total will be found not to tally with the records upon the table, as some specimens have died from injury and some were decomposed. Moreover, in many instances animals are included in the figures of more than one heading, for lesions of importance may have been found in more than one of the anatomical systems. It is seldom the case that only one of the systems is affected sufficiently to be the only cause of death.

Total animals examined, 352.

Total *MAMMALIA*, 104.

Primates, 19; Lemures, 3; Carnivora, 45; Ungulata, 16; Rodentia, 13; Marsupialia, 5; Pinnipedia, 1; Proboscidea, 1; Hyraces, 1.

Total *AVES*, 243.

Passeres, 76; Picariæ, 6; Psittaci, 26; Striges, 9; Anseres, 17; Galli, 66; Columbæ, 6; Accipitres, 17; Herodiones, 4; Struthiones, 5; Fulicariæ, 1; Palamedæ, 1; Odontoglossæ, 1; Limicolæ, 1; Gaviæ, 3; Steganopodes, 4.

Total *REPTILIA*, 5.

Squamata, 3; Crocodilini, 1; Caudata, 1.

Diseases of the gastro intestinal tract:

Stomatitis: Struthiones, 1.

Esophagitis: Psittaci, 2.

Gastritis: Primates, 1; Carnivora, 13; Ungulata, 2; Marsupialia, 1; Pacariæ, 1; Accipitres, 1; Struthiones, 1; Crocodilini, 1.

*Enteritis: Primates, 1; Lemures, 1; Carnivora, 30; Ungulata, 4; Rodentia, 5; Marsupialia, 3; Proboscidea, 1; Pinnipedia, 1; Passeres, 10; Psittaci, 9; Picariæ, 2; Striges, 2; Columbæ, 2; Struthiones, 5; Accipitres, 5; Anseres, 3; Steganopodes, 2; *Galli, 50; Crocodilini, 1.

Prolapsus recti: Carnivora, 1.

Diseases of the circulatory system:

Pericarditis: Primates, 1; Carnivora, 2; Ungulata, 2; Anseres, 1.

Myocardial disease: Primates, 3; Carnivora, 4; Ungulata, 2; Rodentia, 1; Marsupialia, 1; Passeres, 1; Accipitres, 1; Steganopodes, 1; Galli, 2; Anseres, 2.

Arterial disease: Carnivora, 2; Ungulata, 2; Marsupialia, 1; Struthiones, 1; Galli, 1.

Diseases of the hepatic system:

Acute (degenerations inflammations, &c.): Primates, 1; Lemures, 1; Carnivora, 9; Rodentia, 1; Marsupialia, 1; Passeres, 5; Psittaci, 5; Columbæ, 2; Striges, 1; Struthiones, 2; Steganopodes, 1; Proboscidea, 1; Crocodilini, 1.

Chronic (cirrhoses, &c.): Carnivora, 1; Rodentia, 1; Marsupialia, 1; Ungulata, 2.

Diseases of the genito-urinary system:

Nephritis:—

Acute: Primates, 4; Carnivora, 11; Rodentia, 3; Ungulata, 3; Marsupialia, 1; Proboscidea, 1; Passeres, 3; Psittaci, 1; Anseres, 1; Accipitres, 1; Galli, 2.

Chronic: Carnivora, 4; Ungulata, 1; Marsupialia, 1.

Cystitis: Carnivora, 1.

Broken egg: Passeres, 3; Galli, 1.

Eggbound: Accipitres, 1.

Necrosis of oviduct: Galli, 1.

Salpingitis: Anseres, 1.

Metritis: Rodentia, 3.

Dystocia: Rodentia, 1; Hyraces, 1.

Diseases of the respiratory system:

Fibrinous pneumonia: Carnivora, 2; Passeres, 1.

Septic pneumonia: Carnivora, 1; Ungulata, 1; Galli, 2.

Broncho pneumonia: Lemures, 1; Carnivora, 3; Passeres, 3; Galli, 1.

Bronchitis: Carnivora, 1.

Pleuritis: Carnivora, 1; Ungulata, 2; Passeres, 1; Psittaci, 1; Galli, 1.

Diseases of the lymphatic system:

Lymphadenitis: Primates, 1; Carnivora, 11; Rodentia, 2; Pinnipedia, 1; Ungulata, 1.

Splenitis: Carnivora, 10; Rodentia, 2; Marsupialia, 3; Pinnipedia, 1; Passeres, 5; Psittaci, 1; Columbæ, 1; Anseres, 7; Struthiones, 3; Accipitres, 3.

Hemorrhagic infarcts: Carnivora, 1.

Splenomegaly: Passeres, 1.

Diseases of the skeleton:

Rachitis: Carnivora, 3; Primates, 2.

Arthritis: Ungulata, 1; Steganopodes, 1.

Osteomalacia: Columbæ, 1; Galli, 1.

Diseases of the pancreas:

Congestion: Carnivora, 1.

Pancreatitis: Carnivora, 2; Rodentia, 1; Ungulata, 1; Passeres, 1.

Infections:

Tuberculosis: Primates,† 5; Proboscidea, 1; Passeres, 3; Picariæ, 3; Psittaci, 1; Striges, 3; Galli, 3; Accipitres, 1; Fulicariæ, 1.

Mould infection: Passeres, 3; Picariæ, 1; Psittaci, 2; Galli, 1; Anseres, 3; Accipitres, 1.

Acute general infections (septicemia, &c.): Primates, 2; Carnivora, 1; Ungulata, 1; Rodentia, 1; Passeres, 2; Psittaci, 1; Anseres, 1; Struthiones, 1.

Epizootic enteritis: Galli, 46.

Miscellaneous:

Tumors: Rodentia, 2; Carnivora, 1; Proboscidea, 1; Psittaci, 2.

Thyroid disease: Carnivora, 1; Marsupialia, 1; Passeres, 1; Galli, 1.

Peritonitis: Carnivora, 1; Marsupialia, 1; Psittaci, 1; Columbæ, 1; Anseres, 1; Galli, 1; Struthiones, 1.

Amyloidosis: Carnivora, 1.

Heavy infestation with worms with secondary anemia but no other pathological change: Passeres, 2.

* The high total mortality from this condition is due to the fact that the epidemic among the quail (Galli) was listed as an enteritis.

† See notes on tuberculin test.

SECTION II.

TUBERCULIN TEST AND TUBERCULOSIS.

Four old monkeys remained in the quarantine rooms at the time of the last report; during the year twenty new monkeys and lemurs have been received and tested, and during the late summer and autumn all the animals in the large exhibition house were retested. By this general test seven suspicious animals were discovered, two Rhesus Macaques presented by Dr. G. B. Webb (further reference below), a Mandrill Baboon, two Brown Macaques, a Red and a Green Monkey. The last four were put into outdoor cages. The Mandrill was also passed to an outside cage, but was retested and returned to the large house two months later on account of the cold; he is now in good condition.

In January, 1913, Dr. G. B. Webb, of Colorado Springs, sent us two monkeys from his experimental series, one having been treated with a number of injections of living tubercle bacilli and considered immune because it did not react to a subcutaneous injection of tuberculin, the other having received only one injection and to be used as a control. These monkeys were to be exhibited in our general house, exposed to infection just as our own specimens, to test their immunity. A tuberculin test was given on their arrival and as they did not react they were passed to a separate cage in the Monkey House, where they remained from January 12th, 1913, to May 19th, 1914, when one was noticed to cough, and they were both removed to an outside cage. A retest was made in July, 1914, and as one was very suspicious and the other not acceptable in temperature curve, both were killed. The animal treated for several injections was found to have advanced generalized tuberculosis, while the other was free of the disease. It is, however, noteworthy that the lesions in the tuberculous animal were much more fibrous than is common in tubercu-

losis of monkeys; this indicates that while no active immunity had been gained by the animal, its tissues reacted more like the human being's tissues than is usual to find in spontaneous tuberculosis of the Primates. I have never seen a notable attempt at scar formation in tuberculous monkeys aside from this one. Why this one monkey contracted the disease and the other, which had not received any treatment aimed at protection did not, is not clear.

During the year nineteen monkeys have died, four of which were not tested because they were young born in the cages or died too soon after arrival. Of the remaining fifteen, five died of tuberculosis. One of this five was Dr. Webb's Monkey and the rest are as follows: Two Black-handed Spider Monkeys, 45 and 46, received October 8th, 1913; because of a bad chart of one, they were both put in outside cages; one was reinjected pronounced tuberculous, but because of its quality as an exhibit was returned to the outside cage; it was returned to the Laboratory shortly and died May 27th, 1914; the other Spider Monkey remained out-of-doors for several months, was retested in December, 1914, and killed. Anubis Baboon 41 was received Mar. 31, 1914, was passed with Anubis 40 to the monkey house where it died three months later with active progressive lesions; Anubis 40, the only monkey with which it was associated, died five months later without lesions of tuberculosis. The chart given by the animal which died of tuberculosis was good and the disease was probably contracted directly, possibly by infected food from a visitor. Rhesus Macaque 169 was passed March 31st, 1914, to the band-stand cage, where it remained until August 5th, 1914, when it was put into a small cage with Rhesus Macaque 156; here it died with advanced lesions September 21st, 1914. The source of this infection is not clear as no tuberculosis has occurred in the band-stand for three years and Rhesus 156 remains healthy.

From the foregoing it will be seen that only one case of tuberculosis occurred in the Monkey House, although

more would likely have arisen had the general test not been performed. By this means a cageful of suspicious monkeys and one decidedly infected animal (Dr. Webb's) were detected.

The following table represented conditions among the Primates and Lemures. Statistics do not permit extension of the table prior to 1906:—

YEAR ENDING.	Number exhibited during year.	Total dying.	Number tuberculous.	Per cent. of deaths tuberculous.	Per cent. of mortality from tuberculosis.
February 28, 1906		77	60	78
February 28, 1907		33	18	55
February 28, 1908		24	3	12.5
February 28, 1909		26	0	0
February 28, 1910		25	3	12.5
February 28, 1911		30	5	16 $\frac{2}{3}$
February 28, 1912	88	34	12	35	14
February 28, 1913	94	38	19	50	20
February 28, 1914	83	23	0	0	0
February 28, 1915	82	19	5	26	6

There have been no deaths from tuberculosis among the lemurs and marmosets.

Among the other animals there have been sixteen cases, the most important of which is the elephant. It was incidental in two cases and the principal cause of death in fourteen cases. This is a decrease of fourteen, there having been thirty last year. Fifteen cases occurred among the Aves, Passeres, 3; Picariæ, 3; Psittaci, 1; Striges, 3; Galli, 3; Accipitres, 1; Fulicariæ, 1. It is noteworthy that aside from the monkeys only one mammal (elephant) had tuberculosis.

EPIDEMIC ENTERITIS AMONG QUAIL.

An epizootic disease has decimated three newly imported lots of quail, scaled quail (*Callipepla squamata*), Gambel's quail (*Lophortyx gambeli*) and Texas bobwhite (*Ortyx texansus virginianus*). On January 5th,

the first lot of 24 quail arrived from northern New Mexico via Kansas City; on January 11th a second lot of 12 bobwhite arrived from Brownsville, Texas, via Kansas City; the first of this lot died the day after arrival with lesions of this infection. From this lot of birds the first lot was probably infected, the first death occurring on January 20th, no other deaths having occurred in the first lot since arrival. On January 21st the third lot of 12 quail arrived direct from Mexico. The first of this lot died of the disease on January 24th. Some birds were also sent at the time of the arrival of the third consignment, to Dr. Kalbfus of the State Game Commission. It is to be emphasized that to date no cases of infectious enteritis have occurred in the lot sent to Dr. Kalbfus. The first case appeared at this Garden on January 12th, more than a week before the third lot arrived. It would seem that the disease was brought to the Garden by the second lot of birds, and that they picked it up on the way from Texas to Kansas City to Philadelphia. The birds made a stop at Kansas City.

The birds died at long intervals for the first two weeks, but late in January and early in February several died each day. The last death with characteristic lesions occurred February 11th. After the epidemic reached its height it subsided very quickly.

During the illness the birds exhibited very few symptoms, indeed some of them were not known to be sick. A few sat huddled in a corner with ruffled feathers and drooping head; the stools were little if any altered as far as could be determined among so many in the enclosure. At death the birds were in good condition, feathers fairly smooth, skin clear, body plump and fat in good amount, not abundant nor were the animals emaciated.

The principal lesions were enteritis, degenerative necrosis and abscesses in the liver, congestion of all the viscera and plastic peritonitis in a few. A small number showed congestion of the lungs and two had patches of

pneumonia. Many but not all of the birds had *Heterakis* in the ceca.

The process seemed to start as a focal necrotizing lesion in the mucosa or submucosa of the ileum just above the ceca and colon; many had lesions in the ceca and as far down the colon as the cloacal dilatation. Among the animals dying late in the epidemic several showed lesions involving the whole small intestine, a few indeed with greater involvement of the duodenum than of the lower parts.

Judging from the gross and microscopical appearances it seems that the virus causes at first a cellular infiltrate in the mucosa or submucosa upon which necrosis shortly supervenes. The overlying mucosa soon degenerates, and the surface is covered with an indefinite slough. In other cases, especially early in the epidemic, the process extended outward and appeared as muscular or sub-peritoneal necrotic areas before the mucosa was much involved. At all events necrosis was an early change in every case. The blood vessels were usually thrombotic. In the cases that spread toward the peritoneum a plastic peritonitis of varying severity was present.

The focal liver lesions were not present in every case. They took the form of focal necroses or abscesses. Some fatty or parenchymatous degeneration was always present. The liver lesions probably started as inflammations of the veins from which necrotizing or infiltrative lesions spread.

The splenic changes were those of lymphoid hyperplasia, only distinctive in the enormous number of large lymph-cells. Typical microscopical changes are as follows, quoted from one of the autopsy protocols.

The lung showed moderate congestion with here and there a little epithelial swelling and a mild bronchitis and peribronchitis. The type of bronchitis is infiltrative rather than catarrhal. The heart muscle showed granular degeneration of the fibers with breaking up or irregularity of the striæ. Some increase in interfibrillar nuclei and especially those of the capillaries. There is

moderate congestion. Epi- and endocardia are slightly raised as if by edema. Here and there slight fragmentation of fibers. The liver cells are granular and some show fat droplets. There is moderate congestion and more than the normal number of round nuclei between the columns. Here and there are focal necroses of varying sizes without circumferential reaction. Here and there are also small collections of round cells near to which the liver nuclei are large and show attempts at regeneration. In these collections but not in the necroses bacillary forms may be found. There is no reaction on the part of bile ducts. The larger vessels are thrombotic and in one section a thrombo-angiitis was found. One stretch of early plastic perihepatitis was found. The kidney showed slight granularity with slight cloudy swelling of the epithelium. The nuclei of the glomeruli are prominent. There is moderate congestion. The spleen showed distinct large lymph cell hyperplasia with relative inconspicuousness of small round cells. The follicles are very diffuse, their centers filled with large lymph-cells. The cords are hyperplastic and the sinuses compressed. Moderate congestion; no unusual blood destruction; one area of hyaline necrosis found. The proventricle and gizzard are negative with the probable exception of active desquamation on the surface of the former. The outer coats of the duodenum are negative except for slight richness in nuclei. The deep mucosa is very rich in nuclei and red blood-cells. The outer parts of the villi are either swollen with a cellular infiltrate or by an area of granular necrosis, or have disappeared. It would seem that the surface of the mucosa rapidly degenerates and desquamates. Bacteria are very numerous. The adjacent pancreas is negative. The ileum showed round cell infiltration of the deep mucosa, swelling of the villi and a desquamation of the surface. One ulcer was found having its base on the swollen muscularis and being covered with necrotic slough. Adjacent peritoneum is slightly infiltrated, but chiefly congested and edematous. This ileum lesion seems to be the characteristic one of the disease.

Bacteriological observations were made upon cultures obtained from the intestinal mural lesions, the peritoneal exudate, the liver necroses and the hearts' blood in eleven cases. In seven cases I was able to isolate a motile rod like the *B. Coli Communis*, and in four cases a non-motile rod of the *Bact. Aerogenes* type. The former is quite similar to the *B. scoticus* (Migula) reported in grouse disease. Experiments upon the pathogenicity of these organisms are projected.

Judging from reports and based upon the observations of Morse upon Grouse disease it would seem that the incubation period of the disease is about eight to ten days. However, one of the third lot of our birds died within three days of its arrival at this Garden, and therefore within three days of its exposure to the second arrivals; if it be correct that this second lot brought the disease and the third lot did not have it, it would seem that the incubation period can be as short as three days; how long it may be is only suggested by the fact that some of the third lot did not die for three weeks after arrival and exposure. All of the Gambel's and scaled quail succumbed to the disease, but two of the 12 bob-white survived. It would seem that although these last birds probably introduced the disease, they still possessed more resistance than the others, for the second death among them occurred seventeen days after the first death. The epidemic as we have seen it here seems to be the same as Grouse disease of Scotland and as the Grouse disease in this country as reported by Morse (Bureau of Animal Industry Report, 109, May 18th, 1907).

The means of transmission of the disease is not exactly known, but it is in all probability by a pollution of the food, the water supply, or the ground. Since the lesions are so marked in the lower ileum, cecum and colon, a possible transmission by cohabitation must not be entirely overlooked. There does not seem to be any means of limiting the epidemic in a flock by segregation or sacrifice of the infected birds, because symptoms are few and do not appear until shortly before death. Each bird would

have to be put into a separate cage until proved infected. Scrupulous cleansing of the enclosure is desirable, but how efficacious is difficult to state.

PORCUPINES.

On April 16th, 1914, a lot of six Canada Porcupines (*Erethizon dorsatus dorsatus*) arrived; by May 2d all had died. The following are the various diagnoses, 3183 acute follicular enteritis, hemorrhagic pancreatitis, acute splenitis, acute lymphadenitis, cestodes in intestines, oxyuris in cecum, filaria in peritoneum; 3184, acute parenchymatous nephritis, cestodes in intestines; 3189, acute follicular entero-colitis, acute lymphadenitis, cestodes in intestines, filaria in peritoneum, oxyuris in cecum, filaria embryos in blood; 3190, cestodes in intestine, filaria in peritoneum, oxyuris in cecum, decomposition; 3193, obstructed labor, hydroperitoneum, peritoneal and subcutaneous filaria, filaria embryos in blood; 3194, acute serous peritonitis, acute parenchymatous nephritis hemorrhage in kidney containing filaria embryos, cloudy swelling of heart muscle, dilatation of heart, congestion of liver, filaria embryos in liver, acute suppurative catarrhal endometritis, hemorrhage in myometrium, chorionepithelioma, filaria in blood, peritoneal and subcutaneous filaria, foreign bodies (quills) in peritoneal muscles. These animals were all heavily infested with worms, especially filaria, which were found as adults chiefly in the peritoneum, and as embryos in the blood and in blood collections. There does not appear to be any one cause for the deaths aside from the parasites to which I am inclined to attribute but a secondary or predisposing role. Three of the beasts suffered with an acute general infection (3183, 3189, 3194); the worms may have acted as a depressant of natural resistance to some bacterial infection. The worms probably had nothing to do with the dystocia in 3193. There is no indication that the parasitic infestation has produced any severe grade of anemia. The most probable reason for the loss of these animals seems to be that they were unable to adjust themselves to the new conditions in the Garden because of the presence of two varieties of worms in considerable numbers.

TUMORS.

3179. Waltzing Mouse (*Mus wagneri rotans*), retro-peritoneal lymphadenoma with extension to spleen;

3194. Canada Procupine (*Erethizon dorsatus dorsatus*), chorionepithelioma;

3211. Gray Fox (*Canis cinereo-argenteus*), papillary cyst adenoma of the bile ducts;

3250. Indian Elephant (*Elaphus indicus*) multiple calcified fibroid tumors of uterus, leiomyoma of uterine cornu;

3322. Undulated Grass Parrakeet (*Melopsittacus undulatus*), adeno-carcinoma sarcomatodes of liver, leiomyofibroma of spleen;

3490. Undulated Grass Parrakeet (*Melopsittacus undulatus*) papillary cyst adenoma of kidney.

Akin to tumor formation in microscopical structure and because it cannot be associated with inflammations elsewhere should be noted the splenomegally of large lymph-cell type in the White-throated Jay Thrush (*Garrulax albigualris*) No. 3373. There is in this bird a large lymph-cell transformation of the spleen apparently originating in the follicular center and replacing all the splenic tissue. Such a metaplasia or hyperplasia is practically unknown in simple splanitis and there us no focus of inflammation of sufficient age to give a chronic splenitis. The organs aside from the spleen are negative and are practically normal.

The picture in the spleen is not that of Gaucher splenomegaly, nor of infectious leukemia such as was reported in 1908 from this laboratory. For the present a diagnosis of the histological form of this hypertrophy must be retained. No parasitic bodies were seen; bacteriological studies were impracticable.

NOTES.—The body was considerably mutilated but seemed to have been in healthy condition. The organs are negative aside from a slight pallor, except the spleen which is enlarged probably ten times, and bent on itself like a v; capsule is smooth and spanned; surface shows large follicle-like areas separated by pink lines. On section this appearance is maintained, the whole organ being made up of large pale fairly well outlined follicles. It was not possible to make a reliable blood examination because of the coagulation of the blood and the mutilation of the body. Histologically the spleen corresponds with the architecture observed grossly. The follicels are solid accumulations of large lymphocytes with practically no intercellular substance and no small lymphoid elements. The supporting tissue is either distinctly fibrous, as about the blood vessels or as irregular bands of round and tissue cells with delicate fibers. The section makes one think of the cellular deposits of myelogenic leukemia or large cell lymphatic leukemia.

OBSERVATIONS BY DR. E. A. SCHUMANN UPON INTER-
ESTING CONDITIONS FOUND IN THE
FEMALE GENITAL TRACT.

3193. Canada Porcupine (*Erethizon dorsatus dorsatus*), obstructed labor. This animal died from exhaustion due to an impossible labor. On autopsy the abdomen contained a moderate amount of clear serous fluid with one small blood clot. The right uterine cornu was distended with a fetus to about the same diameter as the uterine body. This cornu was congested and edematous, its walls very thin. The cornu was twisted one-half full turn from right to left, so that the pregnant portion overlaid the uterine body anteriorly. The torsion produced a compression of the vessels on the right side to the point of violent congestion of the cornua. There was no apparent rupture of the uterine walls, death having occurred from exhaustion. The fetus and its membranes were normal.

3199. Aoudad (*Ovis tragelaphus*), ruptured parovarian cyst, normal right side pregnancy. The fetus, its placenta and membranes showed no change. The right broad ligament and ovary are negative, the latter containing a red and gray corpus luteum. The left ovary is fibrotic and the left ligament is the seat of a large hematoma, which on section is found to contain thin sheets of gray translucent membrane-like walls of a cyst. The vessels are all distended. Arteries have stiff walls and are empty. Veins have well formed clot. The whole uterus and adnexa were slightly turned to the right, but the twist does not seem to have been sufficient to cause rupture of a broad ligament vessel. Microscopical section of the broad ligament shows a parovarian cyst into which there has been hemorrhage. The cyst is separated from the ovary proper by a short band of tissue which apparently consists of thinned-out ovarian cortex.

3245. Canada Procupine (*Erethizon dorsatus dorsatus*). Acute hemorrhagic metritis. The uterus and cornua are

in their normal positions. The upper segment of the uterine body and cornua were swollen, soft and deep purple. On section the myometrium was found hemorrhagic throughout its entire extent, and there was a small amount of grayish exudate in the uterine cavity. The lower uterine segment and vagina were normal. Two quills were found rather firmly imbedded in the wall of the uterus and in the areolar tissue of the recto-uterine space. They were not surrounded by dense fibrous tissue nor did any evidence of acute inflammation extend from them to the uterus. Microscopically the entire uterine wall showed intense hemorrhage. The muscle layers are separated by blood clot and the utricular glands in many cases are filled with hemorrhagic debris. There is a moderate round cell infiltrate throughout.

3281. Canada Porcupine (*Erethizon dorsatus dorsatus*). Ulcerative metritis with extension to peritoneum. The right cornu showed opacity and stickiness of the serosa and a fusiform swelling about midway of its length. Upon opening an ulcerative endometritis and boggy swelling of the muscularis are found. The serosa is slightly adherent to a part of the mesentery and in the neighborhood but not at the attachment of those adhesions are masses of caseous exudate where the mesentery joins the gut. Microscopically the uterus is the seat of ulcerative endometritis and metritis. Scattered throughout the endometrium are deep layers of ulceration with small areas of necrosis which extend well into the muscle. The entire myometrium showed marked round cell infiltration with few small hemorrhages. The utricular glands have mostly been destroyed by the ulcerative process.

3283. Cape Hyrax (*Hyrax capensis*). Impossible labor due to malformation of the pelvis. This animal died as the result of shock and exhaustion of labor. She was pregnant of two fetuses, one of which was extracted manually by the keeper, but was dead at birth. Twenty-four hours later the animal was found dead. On autopsy

there was present a fully developed fetus in the right cornu, the head just above the pelvic inlet. The left cornu was large and boggy. The myometrium of the right side was so thin as to be almost transparent. On examining the bony pelvis the reason for the dystocia is at once apparent. The sacrum is tilted to the right, and the body of the left ileum is bent sharply to the right, the pelvic inlet being obliquely contracted, the right oblique diameter being 16 mm. while the left is 23 mm. The pelvic obliquity made the birth of a full-sized fetus impossible, the one delivered having been under developed. The myometrium was evidently stretched almost to the point of rupture when death occurred.

DR. WEIDMAN'S REPORT.

Autopsy examination of 352 animals has shown animal parasites in 65 during the last year. While the parasites may be gathered into groups in several instances (*phylloptera* in badgers, *heterakis* in quail, *uncinaria* in Canidæ) their questionable pathogenicity or small numbers have, for the most part, rendered special prophylactic measures of doubtful value. One or two groups, however, deserve individual mention.

UNCINARIASIS.

During the past year, three Canidæ and two Felidæ have come to autopsy showing hookworms. In only one of these (Swift Fox No. 3221), could the worms be considered as producing, beyond peradventure, the death of the animals, the intestine in this case showing multiple small hemorrhages, some of which were at the site of attachment of the worms. An acute hemorrhagic enteritis was associated and the animal was anemic. One hookworm was found in the duodenum and four in the ileum. From the number of hemorrhages there must have been many more worms during life, and it is the belief of the writer that many were flushed out during preagonal diarrhœa. This idea is given from similar

findings on other animals. Thus a tiger (*Felis tigris*) showed but a few (6) ascarides at autopsy, whereas the keeper had found many in the cage in the dejecta just before death. Swift Fox (3239) was known to have hookworms during life, the ova being repeatedly found in the feces, yet no worms were discovered at autopsy, even where specially searched for. Swift Fox (3268) had similarly shown ova antemortem, but at autopsy only one hookworm was found, and this only by straining the intestinal contents and after diligent search. The latter circumstances were repeated to the letter in the case of Red Fox (3306).

As a result of the findings in the Swift Fox first mentioned, the feces of all the Canidæ were examined for parasites with the following results. Hookworm ova, or the living motile larvæ thereof, were found in the dejecta of two Red Foxes, two Swift Foxes and a Prairie Wolf. (The last was not on exhibition.) In addition the sporocysts of *Coccidium bigeminum* Stiles, were found in the feces of the two Swift Foxes and the imago of sarcoptes in the feces of the Prairie Wolf. The Swift Foxes were isolated with the results given later under heading of *Coccidium bigeminum*. One died shortly, the other about two weeks later. Attempts to treat the Red Foxes by thymol were unsuccessful, the animals dying shortly after being restrained. The Prairie Wolf is still in isolation. With the exception of this animal, then, all of the Canidæ infested with hookworms have come to autopsy. That this is a serious malady is proven by the experience of veterinarians with hunting dogs, and of fox breeders on Prince Edwards Island.

The observations of *living* hookworm larvæ in freshly passed feces is of some hygienic importance. The human species must lie *in sand* for several days before hatching and attaining infestive power. The canine species has evidently a shorter incubation period and infestation ought to occur more easily, and therefore more extensively than it has. I think that the prompt removal of dejecta and the cement floors have prevented

such spread, sufficient time and easy lodgment not being given for the development of the infestive stage; this, too, in spite of the comparatively short incubation time of the dog hookworm.

Coccidium bigeminum Stiles in the Swift Fox.

Perhaps the most important parasitological finding this year consisted in the discovery of cysts of *Coccidium bigeminum* Stiles in the feces of two specimens of Swift Fox. They were detected during a routine examination of canine feces for hookworm ova. Since one was drooping both were isolated. Both developed diarrhœa, and one died in a few days, showing severe ulcerative enteritis. On the basis of the material obtained at autopsy, together with additions from the literature, a communication will be made before the Pathological Society of Philadelphia in May. The parasite has been found three times in man and frequently in Paris dogs, but Stiles has not been able to find it in Washington dogs. This is the first time it has been reported in a wild animal.

Spiroptera incerta Smith in parrots.

Twenty-six parrots have died this year out of 199 exhibited. This percentage (13) is lower than in previous years; viz., 23.7 in 1911, 36.3 in 1912, 17.2 in 1913, 17.9 in 1914. During the year twenty-eight newly arrived parrots have been examined, again with the discovery of no ova in the dejecta. Of the four birds mentioned last year as survivors of the ones isolated early in 1912, three survive and show no ova in their droppings. One which died after an experimental injection during xanthoma research showed no worms in the proventricle. The probable explanation of this circumstance is given in last year's report. As no parrots have come to autopsy from the parrot house with these worms, we are inclined to consider the spiroptera enzootic closed.

Investigation as to the nature of a tumor of a Red and Blue Macaw (mentioned in last year's report) continue. Results do not as yet justify statements of any value, although some promise is held forth by the experimental

production in pigeons of giant cells which are similar to those of the macaw tumor. This was done by the implantation of cholesterin crystals in the peritoneal cavity of pigeons.

Respectfully submitted,

HERBERT FOX, M. D.,
Pathologist.

MARCH 1ST, 1915.

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